

UM11544

Filters component user manual

Rev. 1 — 28 January 2021

User manual

Document information

Information	Content
Keywords	Component Library, Filters
Abstract	Getting started with basic filters component



1 Prerequisites

Prior to using this platform agnostic component library, the filters component, this document assumes the user is familiar with the:

- Chosen microcontroller unit (MCU)
- Corresponding software development kit (SDK)
- Cross-compilation tool chain to integrate the filters component.

2 Overview

The filters component is a development model that provides abstraction to apply low-pass, high-pass, band-pass, and band-stop filters. The platform interface provides abstraction to underline communication drivers in SDK, tool chains, and MCUs.

2.1 Filters component design

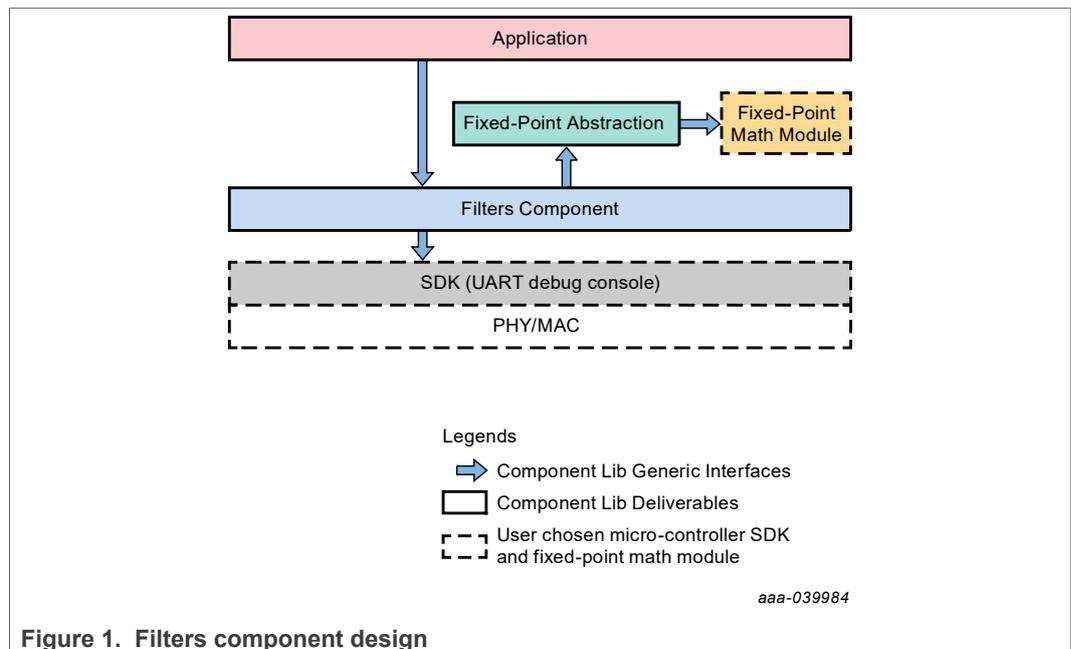


Figure 1. Filters component design

3 Filters component integration

The filters component is designed to be microcontroller agnostic. This section describes development steps to integrate filters component into any microcontroller software development kit (SDK). The filters component provides abstraction to apply low-pass, high-pass, band-pass, and band-stop filters. This component provides both floating-point and fixed-point (Q16.16 format) implementation and provides fixed-point abstraction utilizing libfixmath (platform independent open source library) for fixed-point conversion as an example.

3.1 Filters component directory structure

This section provides a snapshot of the basic filters component directory structure. The below provided snapshot shows directory structure for the filters component:

```
filters/
|-- src
|   |-- filters.c
|   |-- filters.h
|-- example
|   |-- MCUXpresso *
|       └── <project_name>
`-- docs
    |-- CompLib_Filters_UG.docx
    |-- Filters_API_Reference_Manual.zip
common/
|-- fixedpoint_abstraction
|   |-- fixed_point_abs.c
|   |-- fixed_point_abs.h
```

The filters component provides platform independent implementation. The end user is responsible for updating the communication interface to visualize output using the SDK implementation for underlying microcontroller peripherals such as UART. NXP has performed limited testing on the filters component for NXP microcontrollers FRDM-K64F (Cortex M4F core) integrating with MCUXpresso SDK. The reference example project for testing the filters component integration with MCUXpresso SDK is available under “example” folder.

3.2 Filters component content overview

This section provides a brief overview of the filters component source file contents and file descriptions:

```
filters/
|-- src1
|   |-- filters.c2
|   |-- filters.h2
|-- example3
|   |-- MCUXpresso4
|       └── <project_name>5
`-- docs6
    |-- CompLib_Filters_UG.docx7
    |-- Filters_API_Reference_Manual.zip8
common/
|-- fixedpoint_abstraction9
|   |-- fixed_point_abs.c10
|   |-- fixed_point_abs.h10
```

¹Folder containing filters component source files.

²Files containing filters implementations.

³Folder containing filters integration example with MCUXpresso SDK.

⁴Component libraries are provided with the NXP MCUXpresso SDK integration example application. The integration test example applications demonstrate how to integrate platform agnostic component libraries with underlying microcontroller SDK communication interfaces using virtual interface abstraction provided by component libraries.

⁵Folder containing filters integration example for with MCUX.

⁶Folder containing release documentation for filters component.

⁷Filters Component User Guide.

⁸Filters Component API RM.

⁹Folder containing fixed-point math abstraction.

¹⁰Files containing fixed-point math abstraction functions.

Note: Before importing component library example projects for the standalone MCUXpresso IDE, the MCUXpresso IDE requires the corresponding microcontroller SDK package to be downloaded and installed on the IDE.

4 Revision history

Table 1. Revision history

Revision number	Date	Description
1	20210128	Initial release

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